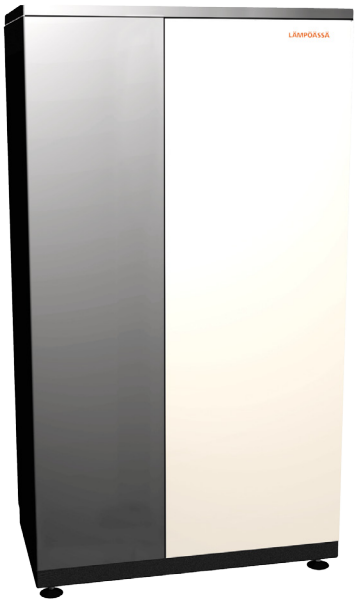
LÄMPÖÄSSÄ
Ground source heat pumps since 1983

USER MANUAL
LÄMPÖÄSSÄ V 7.0 — 30.0



LÄMPÖÄSSÄ 3/2010

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1. GENERAL INFORMATION

We thank you for your confidence in our products and congratulate you on making an excellent choice! You have selected a long-lasting and environmentally friendly Lämpöässä geothermal heat system. We hope that you will enjoy Lämpöässä's heating system which will give you peace of mind for decades. It is important to read the user and maintenance instructions carefully. Please retain this manual for future use and reference should problems occur.

1.1. Safety precautions

To ensure the Lämpöässä geothermal heat system operates in a trouble-free manner and in order to obtain the best operating efficiency, the system must be transported and installed in accordance with the instructions provided by the manufacturer. After installation is complete, the check list provided must be reviewed in order to minimise any installation errors. The manufacturer shall not be responsible for any breakages of equipment which is not installed correctly or any costs incurred as a result of this.

The pipe and electrical installations for the Lämpöässä geothermal heating system can only be installed by qualified persons. If problems occur during installation, we recommend that you contact your retailer or our maintenance department. The telephone number for the maintenance department can be found in the documents delivered with the Lämpöässä heat pump. Electrical connections for the installation of the Lämpöässä may only be set up by qualified electricians.

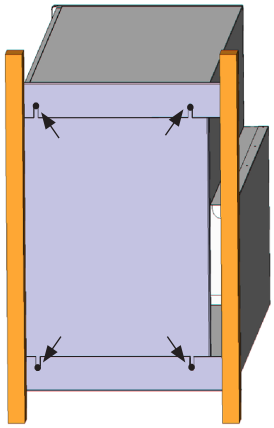
In Lämpöässä V models – to prevent a compressor breakdown – the compressor and water in the storage tank must be preheated for 6 hours before the heat pump is started for the first time. Press the motor protective switch down and switch on the power. This stops the compressor starting and enables the electrical immersion to heat up the compressor and water in the storage tank. The compressor can be started after 6 hours of preheating.

The warranty of the Lämpöässä V compressor is not valid if preheating is not carried out.

1.2. Transportation

The Lämpöässä heat pump must always be transported in a vertical position. If tilting the system is unavoidable, for example to pass through a doorway, it may only be tilted to the left side or back as seen from the front of the heat pump. If the required angle exceeds 45°, the cold unit must be detached during tilting. The unit may be moved from beneath using a forklift, for example. Please note! As the centre of gravity of the heat pump is on the left as seen from the front, and not in the middle due to the placement of the water tank but on the left as seen from the front, the forklift must be placed on the left side of the pump. Do not go underneath the equipment while it is being lifted!

A transportation platform is fastened on both sides of the heat pump using screws. When the screws on the platform are removed, the adjustable feet used for final installation can be found inside.



1.3. Installation area

We recommend that the Lämpöässä geothermal heat pump be installed in a warm space which has a floor drain. During installation and when filling of the ground loop, some geothermal fluid mixture may be splashed on the floor. Glycol/water mixture can be used as well. The chosen area does not have to be fireproof. The floor must be able to withstand the weight of the heat pump carrying a full water tank (= dead weight + 400 kg). The floor must also be sufficiently even, because the heat pump must be as level as possible. Final adjustments can be made using the adjustable feet underneath the equipment.

1.4. Removing the packaging

Remove the plastic wrapping and corner padding from around the product. Check that the heat pump has not suffered any damage during transportation. If the heat pump is found to be damaged, the company which delivered the product must be immediately notified.

Also check the contents of the delivery immediately. Your delivery should include 2 x flexible pipes, an outdoor sensor and a room sensor (latter item optional). Please ensure that you notify us within 5 days if all the additional equipment specified in the order confirmation is not included in the delivery.

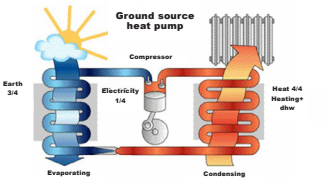
1.5. Structure and operating principles

1.5.1. Structure

The Lämpöässä geothermal heat system consists of a network of heat collection pipes, a geothermal fluid mixture circulating within the network and a geothermal heat pump unit. The geothermal heat pump unit consists of an integrated water tank, compressor, evaporator, condenser and a refrigerant circulating inside the pump. The heat collection fluid in the ground loop and the refrigerant do not mix at any stage of the process.

1.5.2. Operation

The Lämpöässä heat pump transfers heat from the ground, water system or a bore well. Of the total thermal energy required for heating, Lämpöässä collects more than 70% from natural sources. Less than 30% of the electrical energy is required for the collection of thermal energy. This energy is used to run the various components in the system.



The heat collection pipe is a plastic pipe (PEM 40/10) with a water and ethyl alcohol or glycol-water mixture circulating inside. It is placed 1-1.2 metres deep in the ground or at least 3 metres deep in water. The bore well is normally 100-200 metres deep with a diameter of 140-165 mm. The heat pump is used in the transfer of heat from the water and ethyl alcohol mixture. Approximately three degrees of heat is transferred into the refrigerant circulating inside the heat pump, after which the geothermal fluid returns to the ground loop to heat up again.

Heat is transferred from one fluid to another in the evaporator, in which the refrigerant evaporates thanks to the low suction head of the compressor. This binds the heat from the geothermal fluid with the help of a disk thermal exchanger. The pressure of the gaseous refrigerant is increased using a compressor which makes the temperature of the refrigerant rise. The heat contained in the gas is transported in the condenser to heat the water in the water tank and thus produce hot water for use. As the heat is transferred, the gas turns into fluid once again and is carried back through a dehumidification filter and an expansion valve to circulate.

The Lämpöässä geothermal heat pump is suitable for producing hot water and heating single-family households, terraced houses, offices, hotels and industrial halls. Heat distribution can be implemented using floor heating with circulating water, water-filled radiators or the circulation of hot air. Floor heating has the best operating efficiency.

In order to ensure trouble-free operation, all Lämpöässä heat pumps have been test-run, set up and tested by the manufacturer.

2. INSTALLATION

2.1. Before installation

Pipe assemblies for the installation of the Lämpöässä system may only be installed by qualified persons. The unit must be installed in accordance with the instructions provided and a check list must be reviewed after installation in order to minimise errors. The manufacturer shall not be responsible for any breakages of equipment which is not installed correctly or any costs incurred as a result of this.

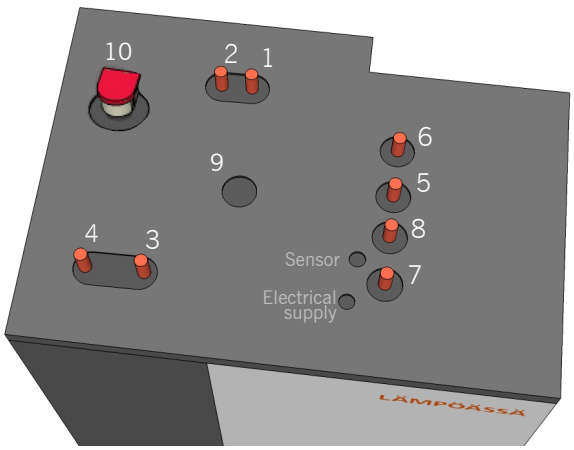
Check that

- all the required hoses and sensors are included in the delivery
- the heat pump has been correctly fitted
- the assemblies on top of the heat pump are intact
- the fuse size is correct for the main fuse and the heat pump (see technical specifications)
- the ground loop pipes and the feed pipes have been installed correctly

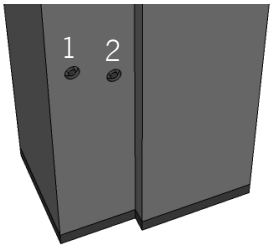
2.2. Pipe-laying

Assemblies on top of the heat pump:

Assemblies	V7.0 - V15.0	V20.0 - V30.0
Domestic water, cold	Nr 1: Cu 22	Nr 1: Cu 22
Domestic water, hot	Nr 2: Cu 22	Nr 2: Cu 22
Auxiliary group, flow	Nr 3: 1"	Nr 3: 1"
Auxiliary group, return	Nr 4: 1"	Nr 4: 1"
Heating circuit 1, return	Nr 5: Cu 28	Nr 6: Cu 42
Heating circuit 1, flow	Nr 6: Cu 28	Nr 5: Cu 42
Heating circuit 2, flow	Nr 7: Cu 28	Nr 7: Cu 42
Heating circuit 2, return	Nr 8: Cu 28	Nr 8: Cu 42
Lift hook / Expansion	Nr 9: 3/4"	Nr 9: 1"
Electrical immersion	-	Nr 10



2.3. Connecting the ground loop



The assemblies Cu 28 (V7.0-15.0) /Cu 35 (V20.0-30.0) for the ground loop are located in a compartment behind the unit as shown. The ground loop assemblies are connected to the ground loop using a flexible assembly pipe. Care must be taken when attaching the assembly pipe.

1. Heat collection, in
2. Heat collection, out

2.4. Filling and de-aeration of the ground loop

Equipment required for the filling and deaeration of the ground loop:

- mixing tank, 60 litres
- a submersible pump fitted with a filter, lifting height approximately 30 m
- water and ethyl alcohol, or glycol-water mixture (1:1) with a frost resistance of -17 degrees Celsius
- 2 x textile hose 1", length approx. 3 m
- 2 x joint 1/2" (female)

THE FILLING AND DE-AERATION PROCESS

Please check that the ground loop has been correctly connected (see "Connecting the ground loop" section) and that the compressor in Lämpöässä V models has been preheated (see "Safety precautions" section).

1. remove the styrofoam packaging protecting the group of fill valves
2. detach the expansion tank from the foremost ball valve
3. close the shut-off valve at the back of the group of fill valves
4. open the foremost shut-off valve in the group of fill valves
5. attach the submercible pump textile hose to the foremost ball valve in the group of fill valves and open the ball valve
6. attach a textile hose from the ball valve at the back of the group of fill valves to the filling container and open the valve
7. fill the container with a geothermal fluid mixture (ethyl alcohol water or glycol with a frost resistance of -17 degrees Celsius)
8. turn on the submersible pump
9. add the water and ethyl alcohol mixture to the mixing container until no more fluid can enter the pipes
10. keep the submersible pump running until the fluid is clear and no gurgling can be heard from the pipes.

Please note! Deaeration usually takes several hours and helps ensure that all the air is removed from the system and that there are no malfunctions once the system is started. LEAVE NO PRESSURE IN THE NETWORK!

11. open the shut-off valve at the back of the group of fill valves
12. close both ball valves
13. remove the filling hoses
14. fasten the expansion tank back in its place in the foremost ball valve in the group of fill valves
15. remove the shut-off valve on the expansion tank
16. fill 3/4 of the expansion tank with the geothermal fluid mixture
17. fasten the shut-off valve to the expansion tank
18. open the foremost shut-off valvae in the group of fill valves
19. remove and clean the net strainer on the mud separator

Filling and deaeration have now been completed.

PLEASE NOTE! Once the heat collecting pipes have been placed in a bore well, we would advise users to switch the positions of the textile hoses in the group of fill valves during filling and deaeration. This increases the efficiency of the pipes.

Deaeration can be made more efficient by using the pump on the ground loop of the heat pump. The circulation water pump on the ground loop and the submersible pump used in the deaeration are then connected in series. The circulation water pump on the ground loop is started as follows:

1. ensure that the red switch on the protective switch for the compressor motor has been pressed down (this stops the compressor activating)
2. turn on the power at the mains
3. turn on the control current
4. turn the switch on the ground loop pump to the left (the pump on the ground loop in continuous use)

Before starting the ground loop pump, fill the filling hose on the suction side with a water and ethyl alcohol mixture using a submersible pump or, for example, a watering can to ensure the ground loop pump does not run empty.

In models 7–10.5, a submersible pump should always be used for deaeration, while in models 13–15, the deaeration can also be carried out using the ground loop pump on the heat pump only. We do, however, recommend the use of an external pump to speed up deaeration and make it more efficient.

2.5. Heating connection

The pipes in the heating network are connected to the thermal heat pump using either textile hoses (network of radiators) or using a fixed piping network (floor heating network). These connections stop sound from passing into the pipes. All heating connections (for example, a heating radiator for an air conditioner or a heated towel rail) must be made to the heat piping. When the network piping on the is in place, filling may commence. The pipes in the network are filled with water. Please note! If renovating, ensure that the heat distribution piping has been properly rinsed before connecting the heat pump.

Filling a heating system fitted with a pressure gauge:

- open the fill valve on the heating network
- fill the piping with water
- deaerate the piping through the water tank
- fill and deaerate the network until all the air has been removed and leave the pressure at 1–1.2 bar

2.6. Domestic water connection and circulation of water

Complete the piping connections according to the piping connections diagram in section 2.2. The circulation water pump is installed on the input side of the heat pump. The mixing valve is fitted to the hot water pipe in order to prevent burns. The overflow pipe is joined to the floor drain as instructed or to an overflow funnel if the distance to the floor drain is more than two metres. The overflow funnel must be directed down towards the floor drain. The backpressure valve is fitted to the cold water joint on the input side.

We recommend that the a timer be installed to control the circulating water pump for running water in so that the pump only operates when water is needed. Without a timer control, the heat pump will have a considerably higher operating time ratio.

2.7. HEPAC check list

Check that

- the connections are tight and there are no leaking valves
- the expansion tank on the heating system and fill side is properly installed
- the overflow pipe on the shut-off valve and the pressure gauge on the heating system have been properly installed
- the heating system has been filled and deaerated appropriately
- the ground loop has been installed, filled and deaerated appropriately
- the foremost valve is open and the rear valve is shut
- the unused solar assemblies on top of the heat pump have been plugged

2.8. Electrical installation and outdoor sensors

Only qualified electricians are permitted to carry out electrical work on the heat pump according to general regulations.

Device		**V 7.0**	**V 9.0**	**V 10.5**	**V 13.0**	**V 15.0**	**V 20.0**	**V 30.0**
Electrical connection		400V 3N~	400V 3N~	400V 3N~	400V 3N~	400V 3N~	400V 3N~	400V 3N~
Fuse size (part)	A	3 x 16 Slow	3 x 16 Slow	3 x 16 (20) Slow	3 x 16 (20) Slow	3 x 16 (20) Slow	3 x 20 Slow	3 x 25 Slow
Electrical connection		230V 1N~	230 1N~	230 1N~				
Fuse size	A	25 Slow	32 Slow	32 Slow				

The Lämpöässä heat pump is connected to a 400 V (50 Hz) or 230 V (50Hz) electrical network. The Lämpöässä heat pump has been fitted with an integrated electrical switchboard to which is permanently powered. A plastic-coated wire is used as a supply line. This wire travels to the master switch in a casing pipe.

DEVICE	**TERMINAL BLOCK NUMBER**	**CONDUCTOR TYPE**
Outdoor sensor TMO	T1	2 X 0.7 mm^2
Room sensor TMR	T3	2 X 0.7 mm^2
Size of the feeder cable * (part)		5 X 2.5 mm^2 (6.0 mm^2)

* If installation conditions require long cabling, a 5 x 6 mm^2 cable should be used in models V 10.5-30.0.

The master switch must be installed before any other installation takes place. In order for the outdoor sensor to recognise weather conditions as effectively as possible, it is very important that it be placed in the correct location. The outdoor sensor should be placed on the north-western or northern side of the building to avoid the effects of the morning sun. If the sensor cannot be placed as recommended, ensure that it is protected from direct sun light.

The sensor is placed approximately 2/3 of the way up the wall of the building near the corner. A sensor should not be placed under a roof, in a place protected from the wind or over a vent, doors or windows where the temperature is not the normal outdoor temperature.

In order for the room sensor to detect average indoor temperatures as reliably as possible, it must be placed in a central and open location, for example a hallway between several rooms or the staircase. String a bipolar electrical line (at least 0.5 mm_2) from the heat pump to the room sensor. Position the room sensor approximately 2/3 of the way up the wall. Connect the room sensor lead to the heat pump. Please note! Leads must be correctly connected in order for the heat pump to operate.

In order to obtain the best results, the room sensor and leads can be tested in diffirent locations before being permanently installed.

2.9. Electricity check list

Check that

- all phases going to the switchboard are in the correct phase sequence
- the fuse size is correct (slow)

2.10. Startup

Before startup, check that:

- the heating system has been connected, filled and deaerated appropriately
- the ground loop has been installed, filled and deaerated appropriately
- electrical connections have been made appropriately and the outdoor sensor (room sensor, optional accessory) has been installed

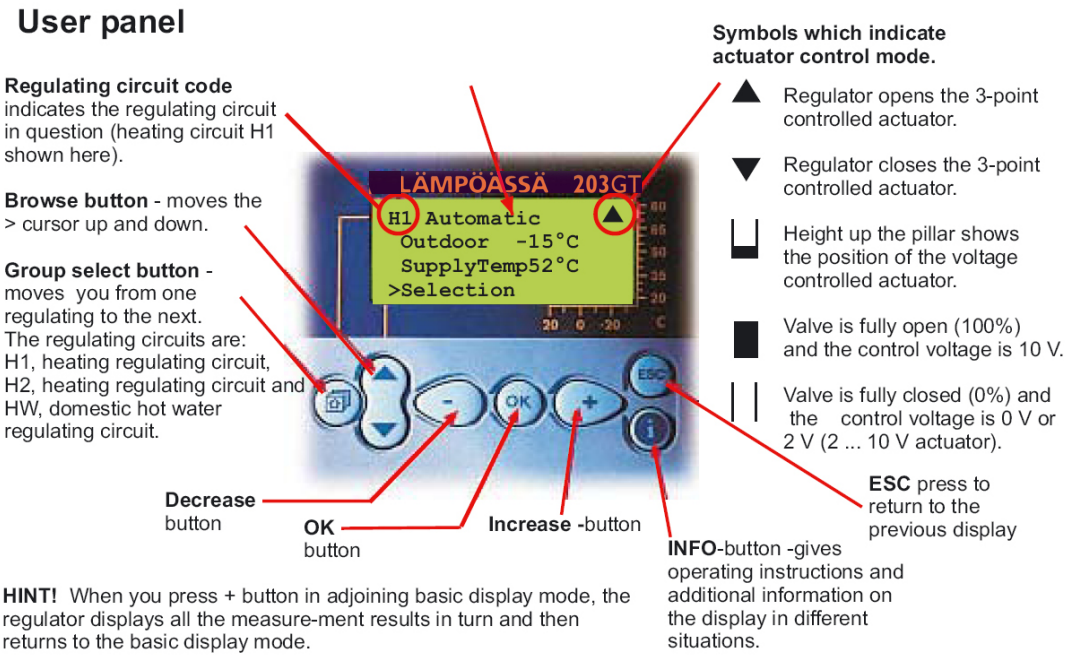
Possible problems during startup

Problem	Cause	Solution
Fuses always blow when the compressor is being started.	You are using the wrong type of fuse.	Check that the fuse is automatic: C or D/ceramic fuse: SLOW or with a snail icon.
	Temporary connections at the site are causing an overload on the fuses.	Reduce load.
The ground loop pump does not start.	The regulator may not be getting any power.	Check the regulator fuse.
	The regulator is not authorised to start the pump.	Check the measured/set values.
	The ground loop pump is rotating in the wrong direction.	Switch the location of the two phases.
	Shut-off valves are in the fill position.	Check that the deaeration and fill valves are in the 'closed' position and that the intermediate valve is open.
The compressor runs for a little while and the steam pressure switch goes off.	There may still be air in the ground loop.	Deaerate the ground loop.
	There may be a leak in the refrigerant loop.	Contact the manufacturer.
The fluid level in the ground loop fill container drops suddenly after startup.	There is a leak in the system (the smell of ethyl alcohol is strong), there is a leak in the ground loop or there is still air in the ground loop.	Check the condition of valves in the deaeration group on the air lock and the shaft seal on the ground loop pump and, if possible, the ground loop extension joints, or deaerate.
Thermal relays go off when starting.	The compressor or the ground loop pump is short-circuited or one of the phases is not activated.	Check electrical connections.
	Fuses in the master switchboard of the building are faulty.	Check and replace fuses as required.

3. USER INFORMATION

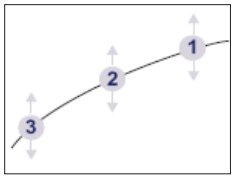
3.1. Lämpöässä settings

Information in this section has been compiled from the Lämpöässä 203/GT Manual, which, in addition to the following, includes more detailed information on the various functions and detailed reading(s).


User panel
Regulating circuit code
indicates the regulating circuit in question (heating circuit H1 shown here).
Browse button - moves the > cursor up and down.
Group select button - moves you from one regulating to the next. The regulating circuits are: H1, heating regulating circuit, H2, heating regulating circuit and HW, domestic hot water regulating circuit.
LÄMPÖÄSSÄ 203GT
H1 Automatic
Outdoor -15°C
SupplyTemp52°C
>Selection
Symbols which indicate actuator control mode.
Regulator opens the 3-point controlled actuator.
Regulator closes the 3-point controlled actuator.
Height up the pillar shows the position of the voltage controlled actuator.
Valve is fully open (100%) and the control voltage is 10 V.
Valve is fully closed (0%) and the control voltage is 0 V or 2 V (2 ... 10 V actuator).
ESC press to return to the previous display
Decrease button
OK button
Increase -button
INFO-button -gives operating instructions and additional information on the display in different situations.
HINT! When you press + button in adjoining basic display mode, the regulator displays all the measure-ment results in turn and then returns to the basic display mode.

3.1.1. Settings for heating curve

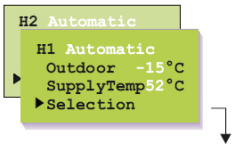
The single most important element for a stable room temperature is a characteristic heating curve of exactly the correct shape. The shape of the heating curve depends on three different values which determine the temperature of the water going to the heater when outdoor temperatures are -20°C, 0°C and +20°C.



The Lämpöässä 203/GT regulator prevents the setting of an incorrectly shaped heating curve. It automatically suggests an adjustment.

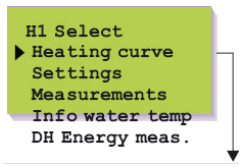
Press ESC until the display no longer changes. You are in the 'Selection' display.

Press OK. You can move from one regulating circuit to another using the browser button.



Use the browser button to move the cursor to “Heating curve”.

Press OK.

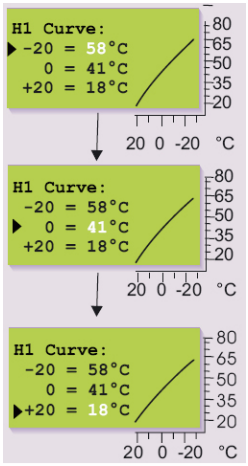


Press OK. Use keys – or + to set the value for the output water when the outdoor temperature is -20°C. Press OK.

Press OK. Use keys – or + to set the value for the output water when the outdoor temperature is 0°C. Press OK.

Press OK. Use keys – or + to set the value for the output water when the outdoor temperature is +20°C. Press OK.

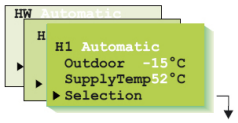
Press ESC to exit.



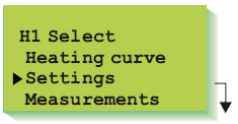
3.1.2. Settings

The Lämpöässä regulator is controlled using set values. The available set values depend on the sensor connections and geothermal heating options. Browsing the set values and changing them is done as follows:

Press ESC until the display no longer changes. You are in the ‘Selection’ display.
Press OK. You can move from one regulating circuit to another using the browser button.



Use the browser button to move the cursor to “Settings”. Press OK.

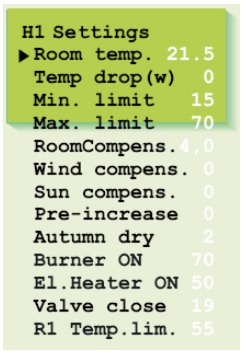


Changing the set values for the heating regulation circuit:

Use the browser button to move the cursor to the setting you wish to change. Press OK.

Use keys - and + to change the value.
Press OK.

Press ESC to exit.



The most common set values:

Set value		Setting range	Comment
Room temperature	21.5°C	5–45°C	Room temperature set value set by the user. During the night reduction, the regulator uses the calculated room temperature value.
Effect of night reduction	0°C	0–35°C	The amount of night reduction for output water activated using a timer, an external home/away switch or GSM control.
Minimum limit	15°C	5–95°C	The lowest permitted temperature for output water. Setting the minimum level of floor heating for tiled floors to 20–25°C ensures comfortable heating and the evaporation of moisture in the summer.
Maximum limit	45°C	15–125°C	The highest permitted temperature for output water. The maximum limit can be used to prevent temperatures that are too high (for example, caused by an error when setting the control characteristic) as well as possibly damage to the piping and surface materials. For floor heating, set at 35–40°C.
Room compensation ratio	1.5°C	0–7.0°C	If the room temperature diverges from the set value, the room compensation function adjusts the temperature of the output water. For example, when the compensation setting is at 4, the function reduces the temperature of the output water by 6°C after an increase of 1.5°C in room temperature (4 x 1.5°C = 6°C).
Autumn drying	1°C	0–15°C	The autumn drying function automatically increases the temperature of output water in the autumn for 20 days. The function is switched on when the average daily temperature has been over 7°C for at least 20 consecutive days and then drops below 7°C. The function is on for the following 20 days when the average daily temperature is below 7°C. The set value for the function shows how much the function increases the temperature of the output water. The factory setting is 1°C.
Closing the valve for the summer	20°C	5–50°C	The outdoor temperature limit at which the regulator closes the valve for regulating circuit L1. Regulating circuit L2 is often used for heating humid spaces. Humid spaces also need to dry in the summer, so the valve in regulating circuit L2 is not closed.
Minimum limit for the temperature for the upper part of the water tank	55°C	5–75°C	If the temperature for the upper water tank (measurement 9) falls below the set value, the measurement allows the compressor to start. The compressor will start provided the temperature in the lower tank (measurement 10) does not prevent it doing so.
Minimum limit for the temperature for the lower part of the water tank	45°C	20–50°C	The regulator starts the compressor if the temperatures of the upper water tank (measurement 9) and the lower water tank (measurement 10) fall below the minimum limit.
Water for use	55°C	5–80°C	Set value for water for use. (Recommendation > +55°C)

The operating efficiency of the device may vary due to the geographical location. The annual operating efficiency reaches its optimal point when the water tank temperature is maintained at the correct level. The factory setting for the minimum set value for the lower part of the water tank is +45°C (30–50). The factory setting for the minimum set value for the upper part of the water tank is +55°C (5–55). As a rule, the set values of the water tank are kept as low as possible to allow for the best annual operating efficiency possible.

During the winter, when the need for heating is great, the set value for the lower part of the water tank should be determined in relation to the temperature of the output water. The temperature of the upper part of the water tank increases after a long period of use and the threshold value for the compressor to run is 95°C.

This is due to the super-heating properties of the water tank structure. This is why a mixing valve for hot water must be used in order to prevent any risk of burns from the scalding hot water. The compressor is controlled, as a rule, according to the minimum setting of the lower part of the water tank.

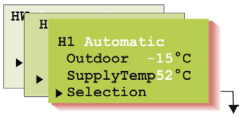
During the summer, when there is no need for heating (with the exception of humid rooms), the compressor is seldom on and there is not enough super-heating to produce hot water for use. In this case, the minimum temperature of the upper part of the water tank can be maintained at +55°C and the compressor will be controlled according to the minimum temperature of the upper part of the water tank.

3.1.3. Measurements

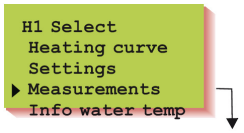
The Lämpöässä 203 regulator can take 14 concurrent readings (11 NTC readings and 2 digital inputs). The display only shows the readings related to the regulator. There are 2 free readings.

Operating instructions:

Press ESC until the display no longer changes. You are in the 'Menu' screen.

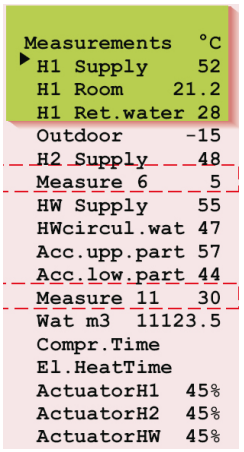


Pressing the + key in this screen, the regulator shows you all the readings one by one and then returns to the standard display screen. The readings can also be browsed in the 'Measurements' screen. Press OK. Use the browser button to move the cursor to 'Measurements'. Press OK.



Browsing the readings:

Use the browser button or the + key to browse through various readings on the display. The 'Measurement' screen shows all the readings for all the regulating circuits. Press ESC to exit the 'Measurements' screen.



Each sensor has its own typical reading range. When the reading value is outside of this range, the display shows a + or - sign to show whether the reading value is above or below the range.

If the sensor is faulty, the regulator sounds an alarm and the reading value shows 'err'.

Terminal block	Reading	Information on the reading	Reading range
1	Outdoor temperature	Outdoor temperature	-50–+50°C
2	L1 Output water	The temperature of output water in regulating circuit 1	0–130°C
3	L1 Room	Room temperature in regulating circuit 1 (room compensation)	-10–+80°C
5	L2 Output water	The temperature of output water in regulating circuit 2	0–130°C
6	Measurement 6	Free temperature reading that can be renamed	-10–+80°C
6	L2 Room	Room temperature in regulating circuit 2 (room compensation)	
6	Wind	Wind speed (% of the sensor reading range)	
6	Sun	Amount of light (% of the sensor reading range)	
7	LV Output water	The temperature of output water for use	0–130°C
8	LV Circulating water	The temperature of return water from use	-10–+80°C
9	Water tank, upper part	The temperature of the upper part of the water tank	0–+130°C
10	Water tank, lower part	The temperature of the lower part of the water tank	0–+130°C
11	Measurement 11	Free temperature reading that can be renamed	0–+130°C
11	Hot gas	The measured temperature of hot gas from the compressor. Please note! Measurement 11 and the hot gas reading are alternative readings.	
	Compressor time	The total running time of the compressor in hours	
	Electric resistor time	The total running time of the electric resistor in hours	
	Motor L1	Setting for valve motor in regulating circuit L1	
	Motor L2	Setting for valve motor in regulating circuit L2	
	Motor LV	Setting for valve motor in regulating circuit for water for use	

3.2. Care and maintenance

The Lämpöässä heat pump is an easy-care heating system. It requires no regular maintenance. If the installation is carried out carefully and in accordance with the instructions provided, there is usually no need for maintenance. The fill container inside the geothermal heat pump should be checked every couple of weeks during the first few months and afterwards approximately once a month for the first year of use thereafter.

3.3. Troubleshooting

If an alarm sounds, we always recommend that you first check that the regulator does not have the 5-minute compressor running prevention enabled. The facility can be overridden by turning the master switch to 0 and back.

The geothermal heat pump is controlled according to two measured values: the measured value at the bottom and at the top of the water tank. A minimum value is determined for each set value in the “Set values” section. In practice, consumption of hot water also starts the compressor. The lower the minimum set value for the lower part of the water tank, the more economical the use of the system. However, it is important to note when determining the set value that values which are too low will reduce the amount of hot water available. Further information is available in the section of the Lämpöässä instructions entitled, “Full power geothermal heating 201/GT and 203/GT”.

Problem	Possible cause	Solution
The compressor does not start	The water tank temperature is adequate and in accordance with the regulator.	No action required.
	The compressor has been stopped for less than 5 minutes.	No action required.
	Fuse problem.	Check the condition of the fuses in the master switchboard.
The compressor does not start and the regulator display reads: “divergence alarm reading 4 compressor operation”.	The protection switch for the motor has gone off. OR The suction pressure switch on the pressure switch has gone off.	Press the protection switch for the motor. OR Set off the switch.
No text is visible on the regulator.	The device is not getting any power.	Check that the control current and master switch are on.
	A fuse has blown.	Replace the fuse (125 mA).
	The display is broken/the circuit board of the regulator is faulty.	Contact maintenance.
Thermal relays go off immediately when power is switched on.	The protection switch for the motor goes off if the equipment is short-circuited or one of the phases is not on.	Contact an electrician.
	Fuses in the master switchboard of the building are faulty.	Check the condition of the fuses and replace as required.
Regulator display reads: Enter code	You have attempted to change the settings in maintenance mode.	Special settings for maintenance mode are not required for normal use. Set values for temperatures can be set in normal mode.
The system does not produce enough heat	A sudden drop in outdoor temperature may temporarily cause inadequate heating power in new buildings, because moisture contained in the structure takes up a lot of heat when it dries.	No action required.
	During the first year, the ground loop may not produce heat at full power because the earth around the ground loop pipes has not yet become more solid.	No action required.

The set value and measured value for the regulator do not match.	A maximum limit has been used for the set values.	
	A spiking over-voltage caused by a lightning strike has caused a fault in the condenser, causing the temperature to drop from the actual values.	The regulator must be replaced (not under warranty).
	The regulator motor has been set on manual and the regulation does not take place.	
	In the summer, the temperature in the room where the heat pump is located may rise to up to 30 degrees Celsius. In these cases, the temperature sensor for the output water is reading the air temperature instead of the temperature for the output water.	No action required.
The compressor is on all the time or for long periods of time.	A lot of heat is needed, for example the outdoor temperature is very low or the structure is drying during the first year's use of the building.	No action required.
	Lack of refrigerant. Can be detected from bubbles in the liquid container even after some minutes of use.	Contact a refrigeration supplier or maintenance.
	The processor/software on the regulator is faulty.	Turn off the control current switch for 10 seconds and turn it back on. If turning off the power does not help, contact maintenance.

If the above instructions do not help, please contact your local Lämpöässä dealer.

PLEASE NOTE! The warranty shall be subject to the existence of an appropriately completed and issued warranty certificate and a certificate signed by the user stating that the mechanic instructed the user on how to operate the equipment.

4. TECHNICAL SPECIFICATIONS

4.1. Chart

Lämpöässä heat pump		V 7.0	V 9.0	V 10.5	V 13.0	V 15.0	V 20.0	V 30.0
Dimensions								
width	mm	900	900	900	1050	1050	1250	1250
depth	mm	650	650	650	650	650	800	800
height	mm	1900	1900	1900	1900	1900	1900	1900
Weight	kg	430	435	440	490	495	600	630
Compressor		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Refrigerant	g	1400	1400	1400	1750	1750	2820	2900
Max length of ground loop	m	300	300	300	500	500	500	500
Water tank capacity	litres	420	420	420	520	520	750	750
Max pressure radiator	bar	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Heat regulator as standard		201 GT	201 GT	201 GT	201 GT	201 GT	201 GT	201 GT
Electrical connection 400V 3N~								
Priority relay		Yes	Yes	Yes	Yes	Yes	Yes	No
Supplied output 35/50°C *	kW	7.9 / 7.2	9.9 / 9.0	11.4 / 10.6	14.2 / 13.1	16.7 / 15.3	20.64 / 18.93	31.18 / 28.92
Supplied input 35/50°C *	kW	1.74 / 2.27	2.12 / 2.76	2.42 / 3.31	3.03 / 4.04	3.57 / 4.64	4.83 / 5.94	7.92 / 10.15
Start current	A	28	33	37	45	52	88	159
Running current 0/35°C	A	3.7	4.5	4.8	5.9	6.8	9.6	12.8
Running current 0/50°C	A	4.3	5.1	5.8	7.1	8.2	11.1	16.0
Fuse size, Slow (part)	A	3 x 16	3 x 16	3 x 16 (20)	3 x 16 (20)	3 x 16 (20)	3 x 20	3 x 25
Electrical connection 230 V 1N~								
Supplied output 35/50°C *	kW	7.55 / 7.05	9.45 / 8.85	11.2 / 10.45				
Supplied input 35/50°C *	kW	1.66 / 2.17	2.18 / 2.81	2.42 / 3.22				
Running current 0/35°C	A	8.3	11.9	11.9				
Running current 0/50°C	A	10.3	14.2	15.2				
Fuse size	A	25 Slow	32 Slow	32 Slow				

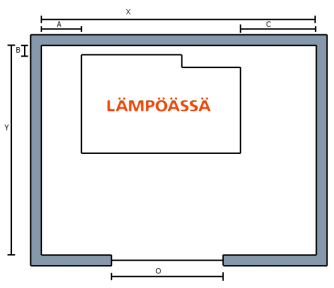
* Ground collector 0°C

4.2. Space requirements

The Lämpöässä heat pump can be positioned anywhere in a technical or utility room. The heat pump does not require much more floor space than its external dimensions. All Lämpöässä geothermal heat pumps are 1.9 metres in height. Approximately 0.4 metres of space must be reserved for the assemblies on top of the heat pump. This should be taken into account when placing the heat pump in a low room, such as a basement.

The Lämpöässä geothermal heat pump should be installed in a warm, insulated space which has a floor drain, because some ground loop fluid may be splashed on the floor when the ground loop is filled. The chosen area does not need to be fireproof.

mm	V 7.0	V 9.0	V 10.5	V 13.0	V 15.0	V 20.0	V 30.0
A	50	50	50	50	50	50	50
B	50	50	50	50	50	150	150
C	200	200	200	200	200	500	500
O	700	700	700	700	700	950	950
X	1200	1200	1200	1200	1200	1800	1800
Y	1300	1300	1300	1300	1300	1500	1500



5. WARRANTY

Suomen Lämpöpumpputekniikka Oy offers a two- (2) year warranty with the Lämpöässä V geothermal heat pumps it manufactures. The manufacturer shall not be responsible for any breakages of equipment which is not installed correctly, any brekages of equipment which is installed contrary to the instructions provided, or any costs incurred as a result of these actions.

The warranty shall be subject to the existence of an appropriately completed and issued warranty certificate and a certificate signed by the user stating that the mechanic instructed the user on how to operate the equipment.

6. APPENDIX

Current control relays adjusting and connecting, device V 7.0 — 30.0

Connection diagram, device V 7.0 — 15.0, 1 circuit

Connection diagram, device V 7.0 — 15.0, 2 circuit

Connection diagram, device V 20.0, 1 circuit

Connection diagram, device V 20.0, 2 circuit

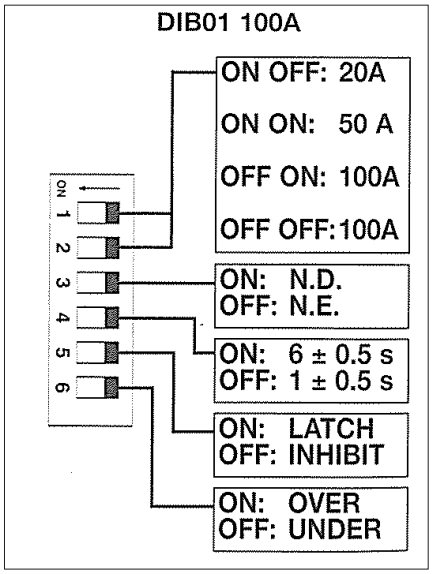
Electrical diagram, device V 7.0 — 10.5, 1N~

Electrical diagram, device V 7.0 — 10.5, 3N~

Electrical diagram, device V 13.0 — 15.0, 3N~

Electrical diagram, device V 20.0 — 30.0, 3N~

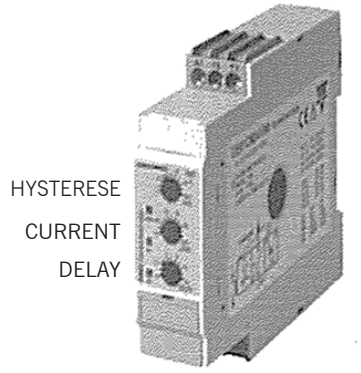
CURRENT CONTROL RELAYS ADJUSTING AND CONNECTING



These values are default values you can get change those values.
Relays have to adjust always case sensitive.

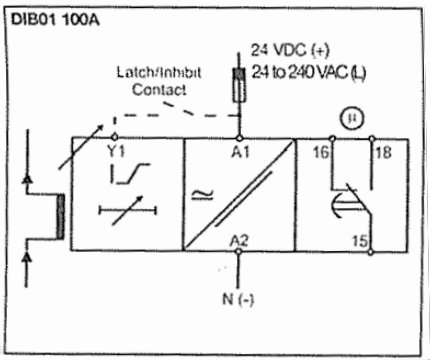
1. Choice correct current area
   - Turn switch 2 position ON (when main fuse are less than 50A)
   - Others switchs 1,3-6 position OFF.

2. Adjust hyseresis current % and delay srews from the front (main fuse 25A)
   - Hysteresis 21
   - Current 25 - 28 %
   - Delay 1s

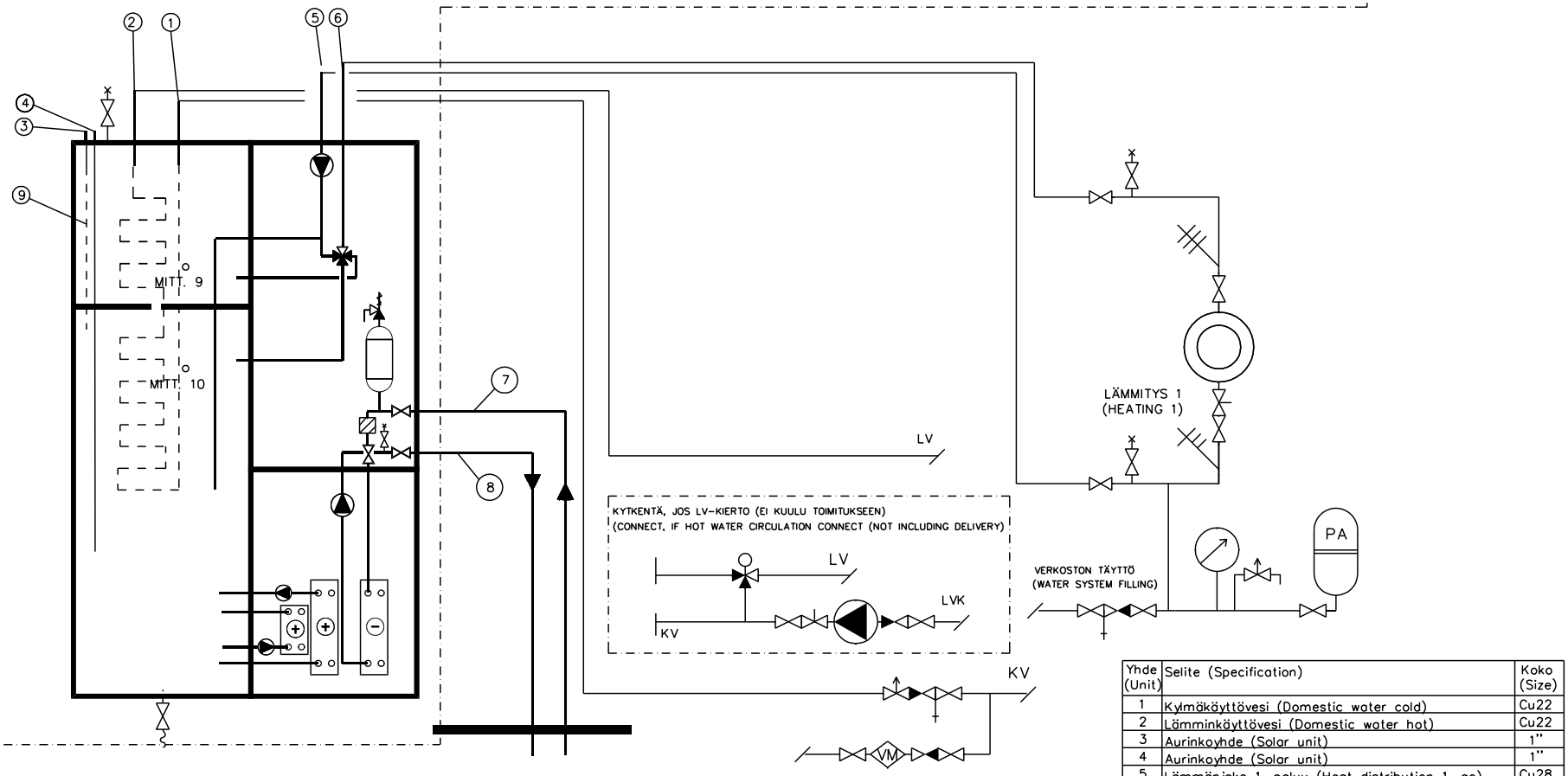


SWITCHES ARE UNDER THE COVER

- Relay need external power 24-240 V/AC.
- External power connect connectors A1 and A2.
- Connectors 15 and 16 connect ground heat pump and those cut power on the immersion heaters those line what current limit are exceed.
- Every line must be lead through to relays.
  - L1 1- relay
  - L2 2- relay
  - L3 3- relay



LÄMPÖÄSSÄ 201/GT



Yhde (Unit)	Selite (Specification)	Koko (Size)
1	Kylmäkäyttövesi (Domestic water cold)	Cu22
2	Lämminkäyttövesi (Domestic water hot)	Cu22
3	Aurinkoyhde (Solar unit)	1"
4	Aurinkoyhde (Solar unit)	1"
5	Lämmänjako 1, paluu (Heat distribution 1, go)	Cu28
6	Lämmänjako 1, meno (Heat distribution 1, return)	Cu28
7	Maapiiri, sisään (Ground circuit, in)	Cu28
8	Maapiiri, ulos (Ground circuit, out)	Cu28
9	Jatkoputki, lisävaruste(extension tube, accessory)	

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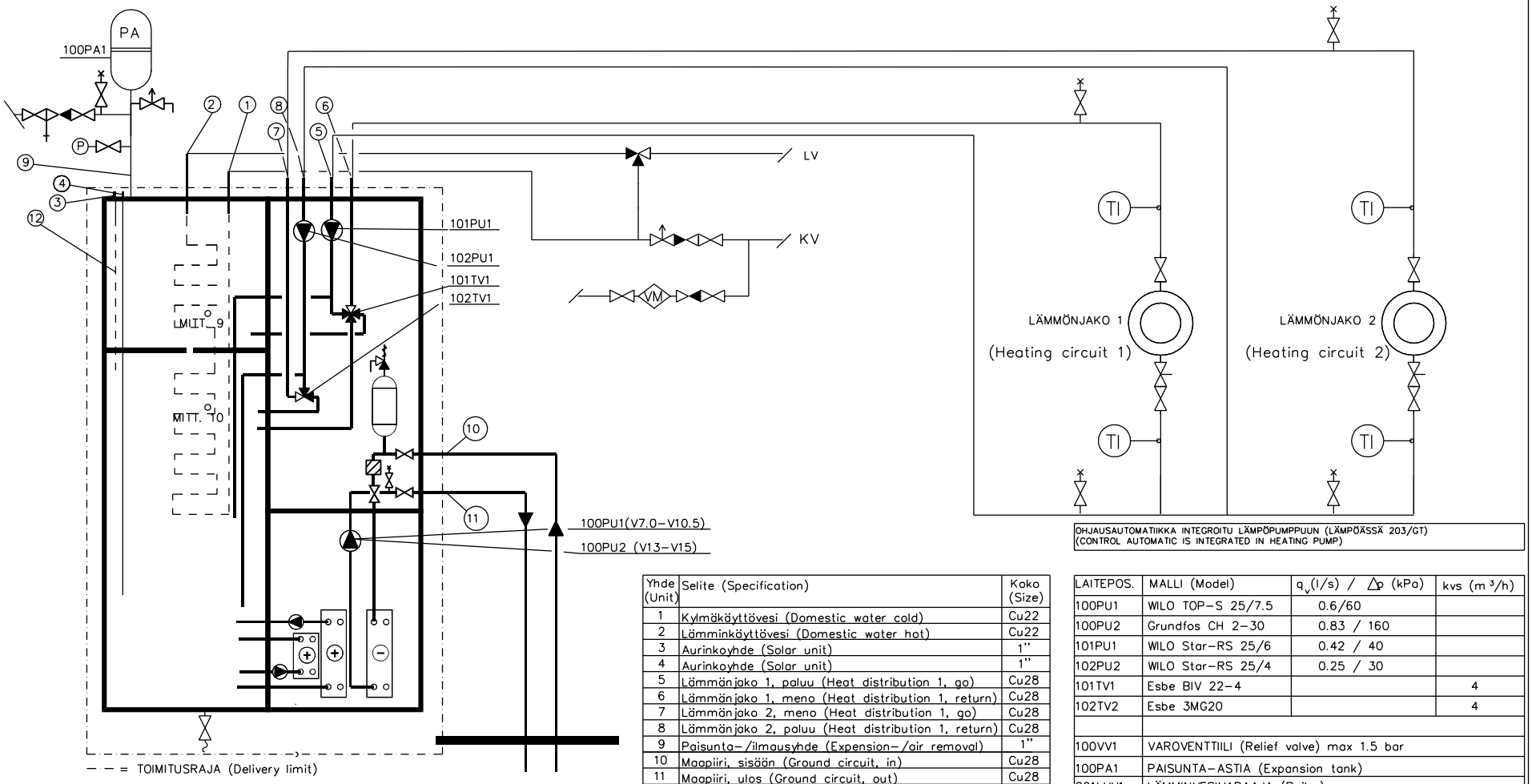
LÄMPÖÄSSÄ

SUUNN. JVi | PIIRT.
PVM. 21.10.2008
ALLEKIRJOITUS

HVAC SCHEMATIC/1-CIRCUIT CONNECTION
CONTROL LÄMPÖÄSSÄ 201/GT
LÄMPÖÄSSÄ V7.0-V15

LVI KYTKENTÄKAAVIO/1-PIIRIKYTKENTÄ
OHJAUS LÄMPÖÄSSÄ 201/GT
LÄMPÖÄSSÄ V7.0-V15

SUUNNITTELUALA, TYÖN JA PIIRUSTUKSEN N:O | MUUTOS
L V715 201GT 09A
LEHTI | LEHDISTÄ | TILAAJAN N:O



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6	Lämmänjako 1, meno (Heat distribution 1, return)	Cu28
7	Lämmänjako 2, meno (Heat distribution 1, go)	Cu28
8	Lämmänjako 2, paluu (Heat distribution 1, return)	Cu28
9	Paisunta–/ilmausyhde (Expension–/air removal)	1"
10	Maapiiri, sisään (Ground circuit, in)	Cu28
11	Maapiiri, ulos (Ground circuit, out)	Cu28
12	Jatkoputki, lisävaruste(extension tube, accessory)	

OHJAUSAUTOMATIIKKA INTEGROITU LÄMPÖPUMPPUUN (LÄMPÖÄSSÄ 203/GT)
(CONTROL AUTOMATIC IS INTEGRATED IN HEATING PUMP)

LAITEPOS.	MALLI (Model)	q_v(l/s) / Δp (kPa)	kvs (m³/h)
100PU1	WILO TOP–S 25/7.5	0.6/60	
100PU2	Grundfos CH 2–30	0.83 / 160	
101PU1	WILO Star–RS 25/6	0.42 / 40	
102PU2	WILO Star–RS 25/4	0.25 / 30	
101TV1	Esbe BIV 22–4		4
102TV2	Esbe 3MG20		4
100VV1	VAROVENTTIILI (Relief valve) max 1.5 bar		
100PA1	PAISUNTA–ASTIA (Expansion tank)		
201LVV1	LÄMMINVESIVARAAJA (Boiler)		
201PU1	LVK–PUMPPU (Recycling hot water pump)		

LÄMPÖÄSSÄ

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ALLEKIRJOITUS	

HVAC SCHEMATIC/2–CIRCUIT CONNECTION
CONTROL LÄMPÖÄSSÄ 203/GT
LÄMPÖÄSSÄ V7.0–V15

LVI KYTKENTÄKAAVIO/2–PIIRIKYTKENTÄ
OHJAUS LÄMPÖÄSSÄ 203/GT
LÄMPÖÄSSÄ V7.0–V15

SUUNNITTELUALA, TYÖN JA PIIRUSTUKSEN N:O MUUTOS
L V715 203GT 09A
LEHTI | LEHDISTÄ | TILAAJAN N:O

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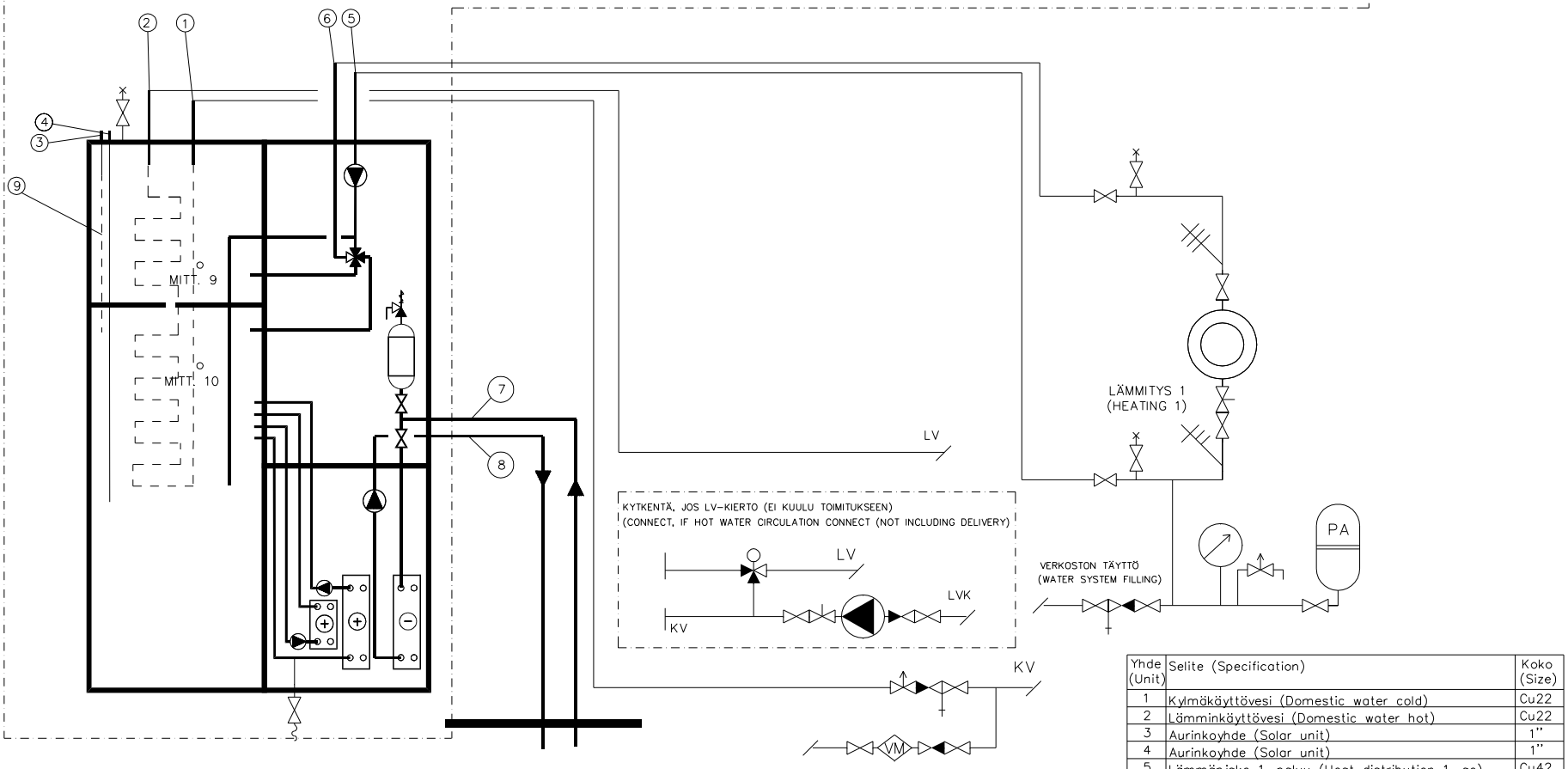
LÄMPÖÄSSÄ 201/GT



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4	Aurinkoyhde (Solar unit)	1"
5	Lämmänjako 1, paluu (Heat distribution 1, go)	Cu42
6	Lämmänjako 1, meno (Heat distribution 1, return)	Cu42
7	Maapiiri, sisään (Ground circuit, in)	Cu35
8	Maapiiri, ulos (Ground circuit, out)	Cu35
9	Jatkoputki, lisävaruste(extension tube, accessory)	

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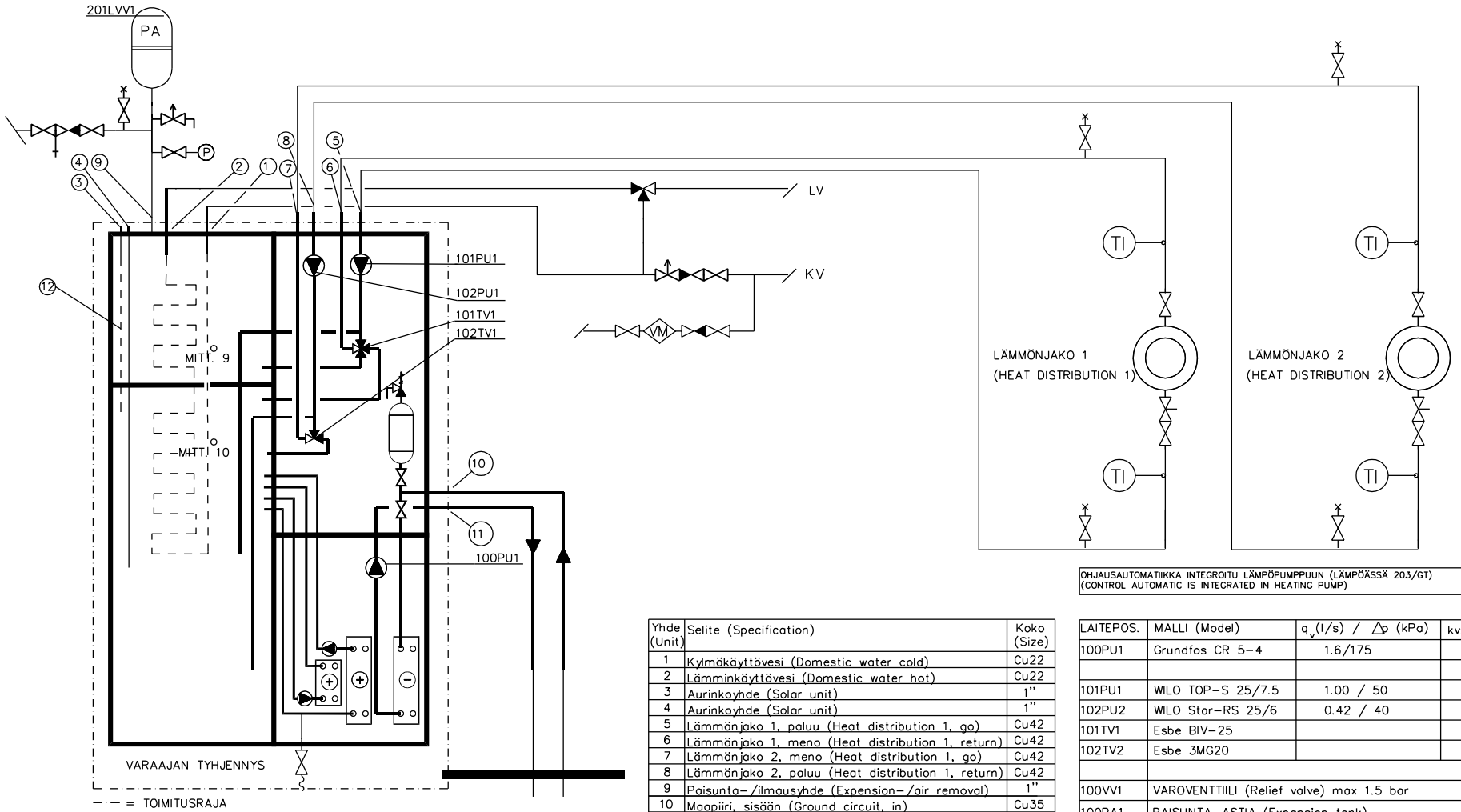
HVAC SCHEMATIC/1-CIRCUIT CONNECTION
CONTROL LÄMPÖÄSSÄ 201/GT
LÄMPÖÄSSÄ V20-V30

LVI KYTKENTÄKAAVIO/1-PIIRIKYTKENTÄ
OHJAUS LÄMPÖÄSSÄ 201/GT
LÄMPÖÄSSÄ V20-V30

SUUNNITTELUALA, TYÖN JA PIIRUSTUKSEN N:O | MUUTOS

L V2030 201GT 09A

LEHTI | LEHDISTÄ | TILAAJAN N:O



JOS MAAPIIREJÄ 1 TAI USEAMPI KPL. HUOMIOITAVA JOKA PIIRIIN OMA SULKUVENTTIILI JA LINJANSÄÄTÖVENTTIILI.

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6	Lämmänjako 1, meno (Heat distribution 1, return)	Cu42
7	Lämmänjako 2, meno (Heat distribution 1, go)	Cu42
8	Lämmänjako 2, paluu (Heat distribution 1, return)	Cu42
9	Paisunta-/ilmausyhde (Expension-/air removal)	1"
10	Maapiiri, sisään (Ground circuit, in)	Cu35
11	Maapiiri, ulos (Ground circuit, out)	Cu35
12	Jatkoputki, lisävaruste(extension tube, accessory)	

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(CONTROL AUTOMATIC IS INTEGRATED IN HEATING PUMP)

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100PU1	Grundfos CR 5-4	1.6/175	
101PU1	WILO TOP-S 25/7.5	1.00 / 50	
102PU2	WILO Star-RS 25/6	0.42 / 40	
101TV1	Esbe BIV-25		12
102TV2	Esbe 3MG20		4
100VV1	VAROVENTTIILI (Relief valve) max 1.5 bar		
100PA1	PAISUNTA-ASTIA (Expansion tank)		
201LVV1	LÄMMINVESIVARAAJA (Boiler)		
201PU1	LVK-PUMPPU (Recycling hot water pump)		

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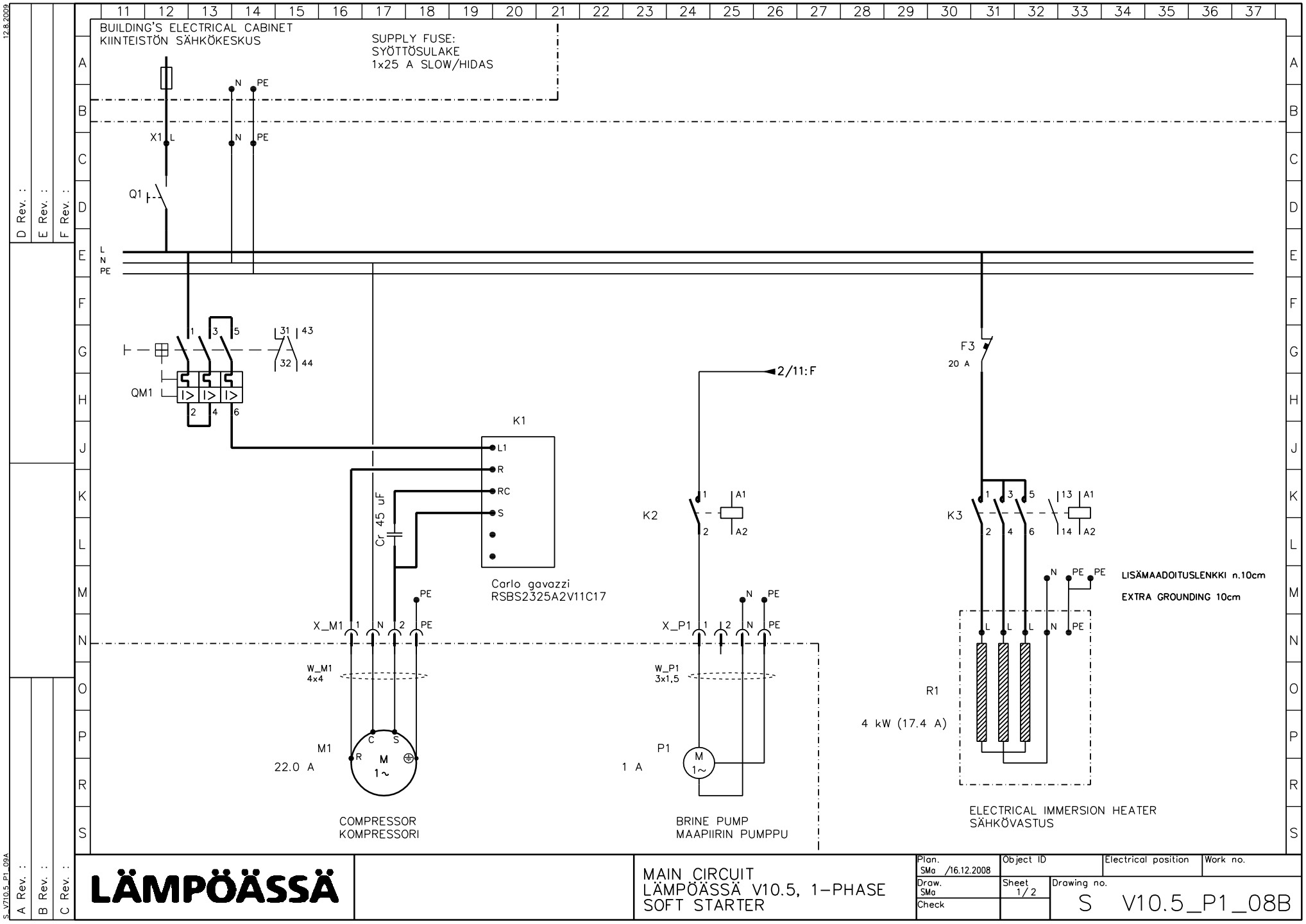
HVAC SCHEMATIC/2-CIRCUIT CONNECTION
CONTROL LÄMPÖÄSSÄ 203/GT
LÄMPÖÄSSÄ V20-V30

LVI KYTKENTÄKAAVIO/2-PIIRIKYTKENTÄ
OHJAUS LÄMPÖÄSSÄ 203/GT
LÄMPÖÄSSÄ V20-V30

SUUNNITTELUALA, TYÖN JA PIIRUSTUKSEN N:O | MUUTOS
L V2030 203GT 09A
LEHTI | LEHDISTÄ | TILAAJAN N:O



LÄMPÖÄSSÄ

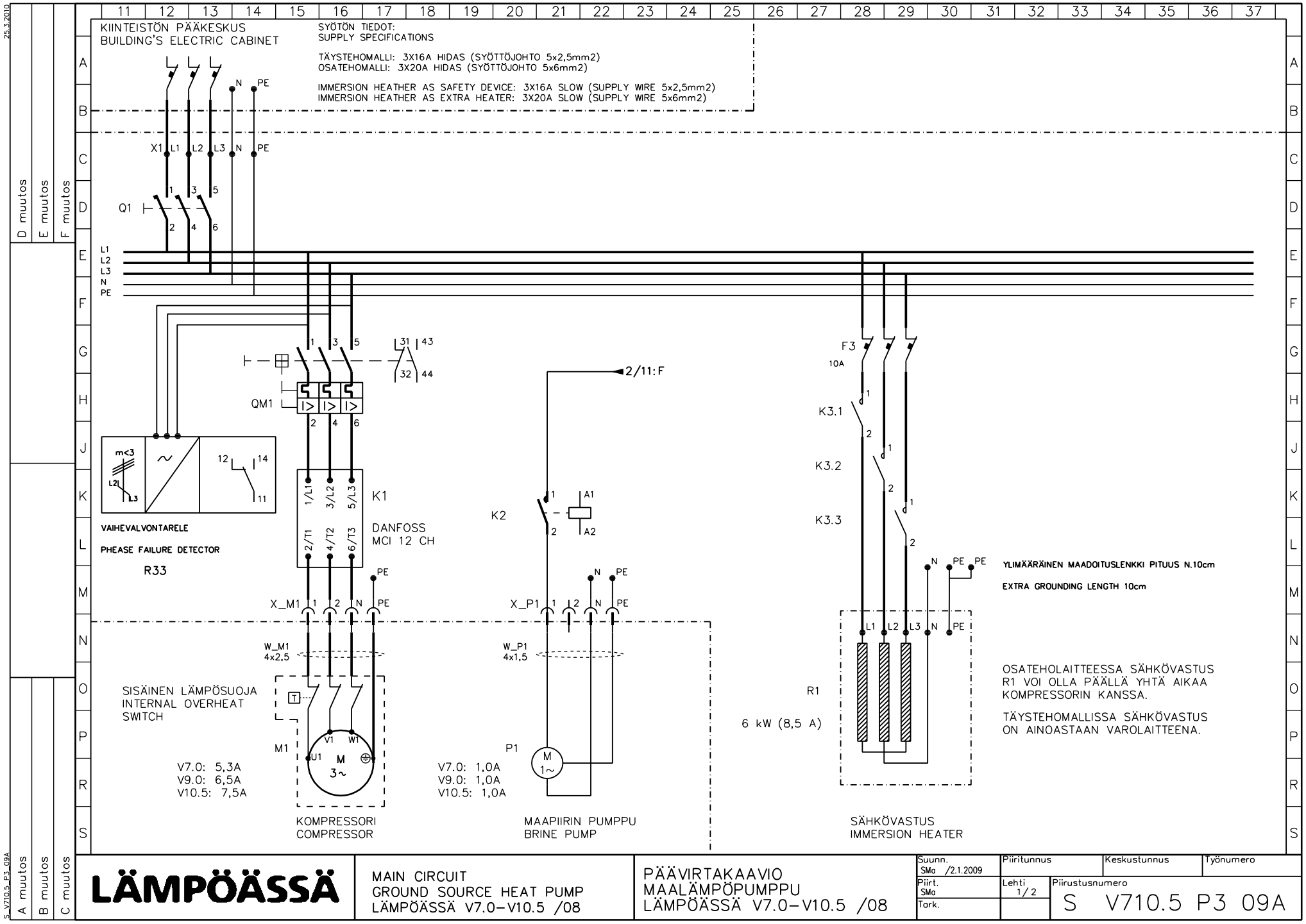
MAIN CIRCUIT
LÄMPÖÄSSÄ V10.5, 1-PHASE
SOFT STARTER

Plan. SMa /16.12.2008	Object ID	Electrical position	Work no.
Draw. SMa	Sheet 1/2	Drawing no. S V10.5_P1_08B	
Check			

D Rev. :
E Rev. :
F Rev. :
A Rev. :
B Rev. :
C Rev. :

12.8.2009

S_V710.5_P1_09A



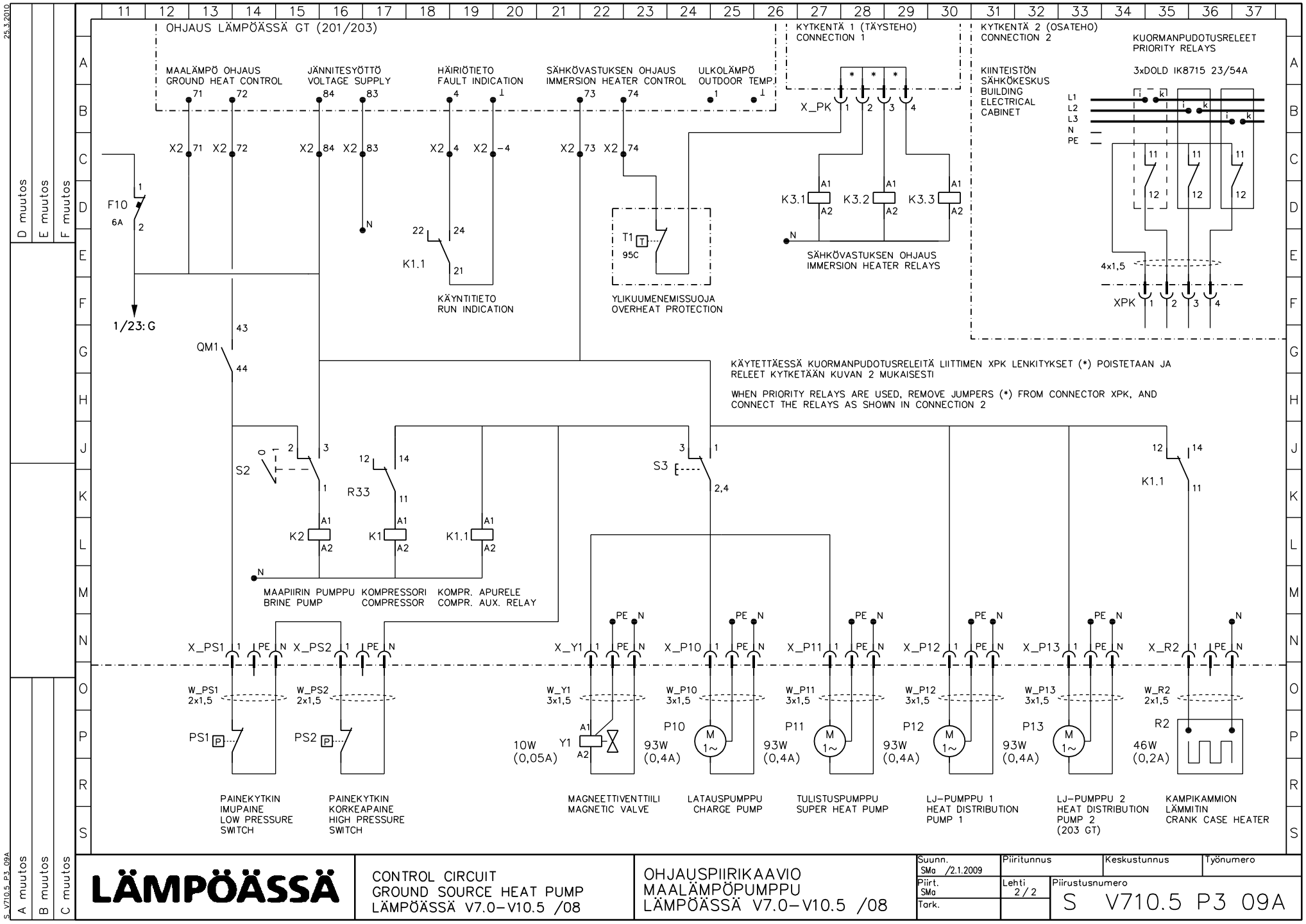
D muutos
E muutos
F muutos
A muutos
B muutos
C muutos
25.3.2010
S_V710.5_P3_09A

LÄMPÖÄSSÄ

MAIN CIRCUIT
GROUND SOURCE HEAT PUMP
LÄMPÖÄSSÄ V7.0–V10.5 /08

PÄÄVIRTAKAAVIO
MAALÄMPÖPUMPPU
LÄMPÖÄSSÄ V7.0–V10.5 /08

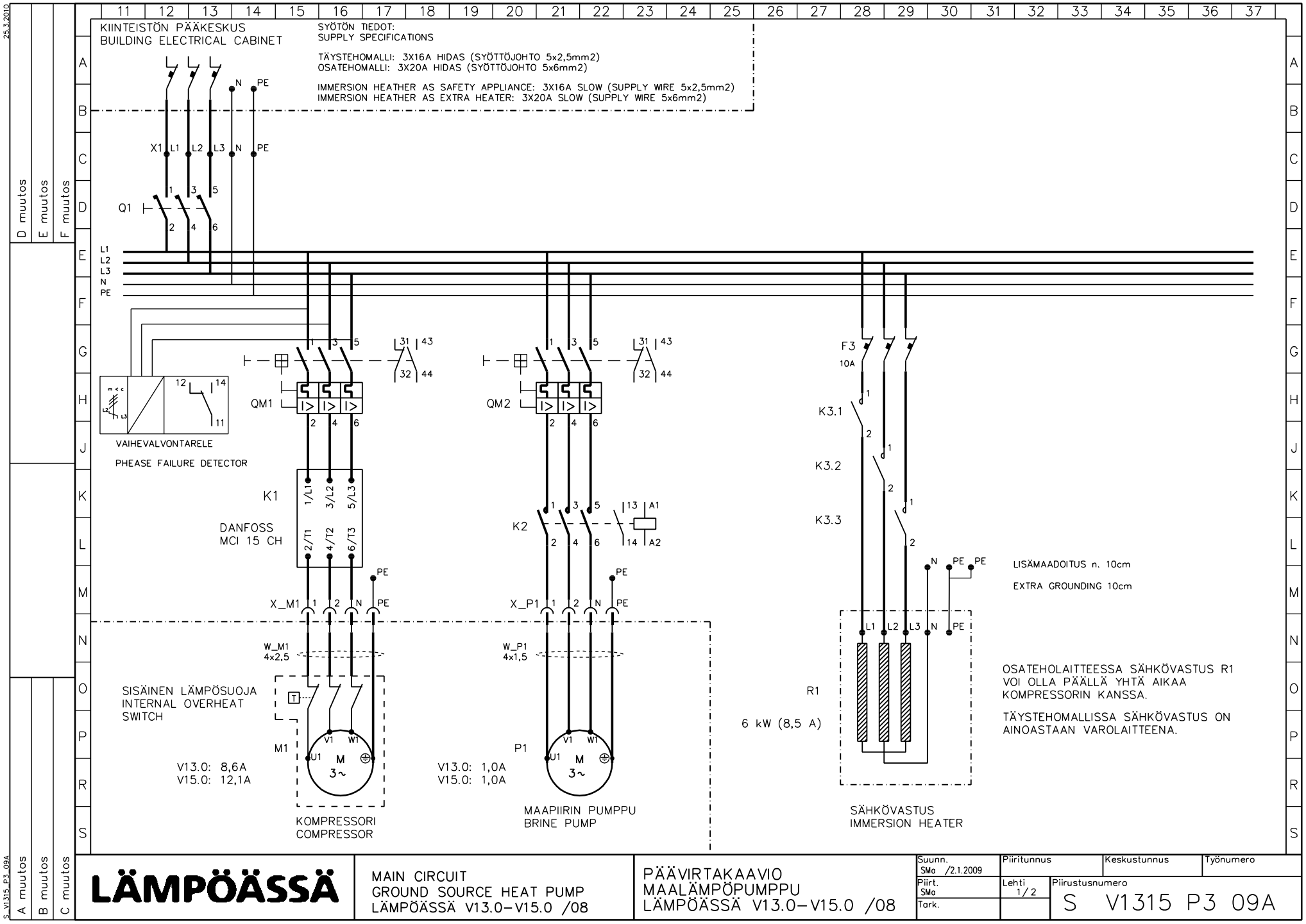
Suunn. SMa /2.1.2009	Piiritunnus	Keskustunnus	Työnumero
Piirt. SMa	Lehti 1/2	Piirustusnumero S V710.5 P3 09A	
Tark.			



LÄMPÖÄSSÄ	CONTROL CIRCUIT GROUND SOURCE HEAT PUMP LÄMPÖÄSSÄ V7.0–V10.5 /08	OHJAUSPIIRIKAAVIO MAALÄMPÖPUMPPU LÄMPÖÄSSÄ V7.0–V10.5 /08	Suunn. SMa 2.1.2009 Piirt. SMa Tark.	Piiritunnus Lehti 2/2	Keskustunnus Piirustusnumero S V710.5 P3 09A

Työnumero

D muutos 25.3.2010
E muutos
F muutos
A muutos
B muutos
C muutos
S_V710.5_P3_09A



LÄMPÖÄSSÄ

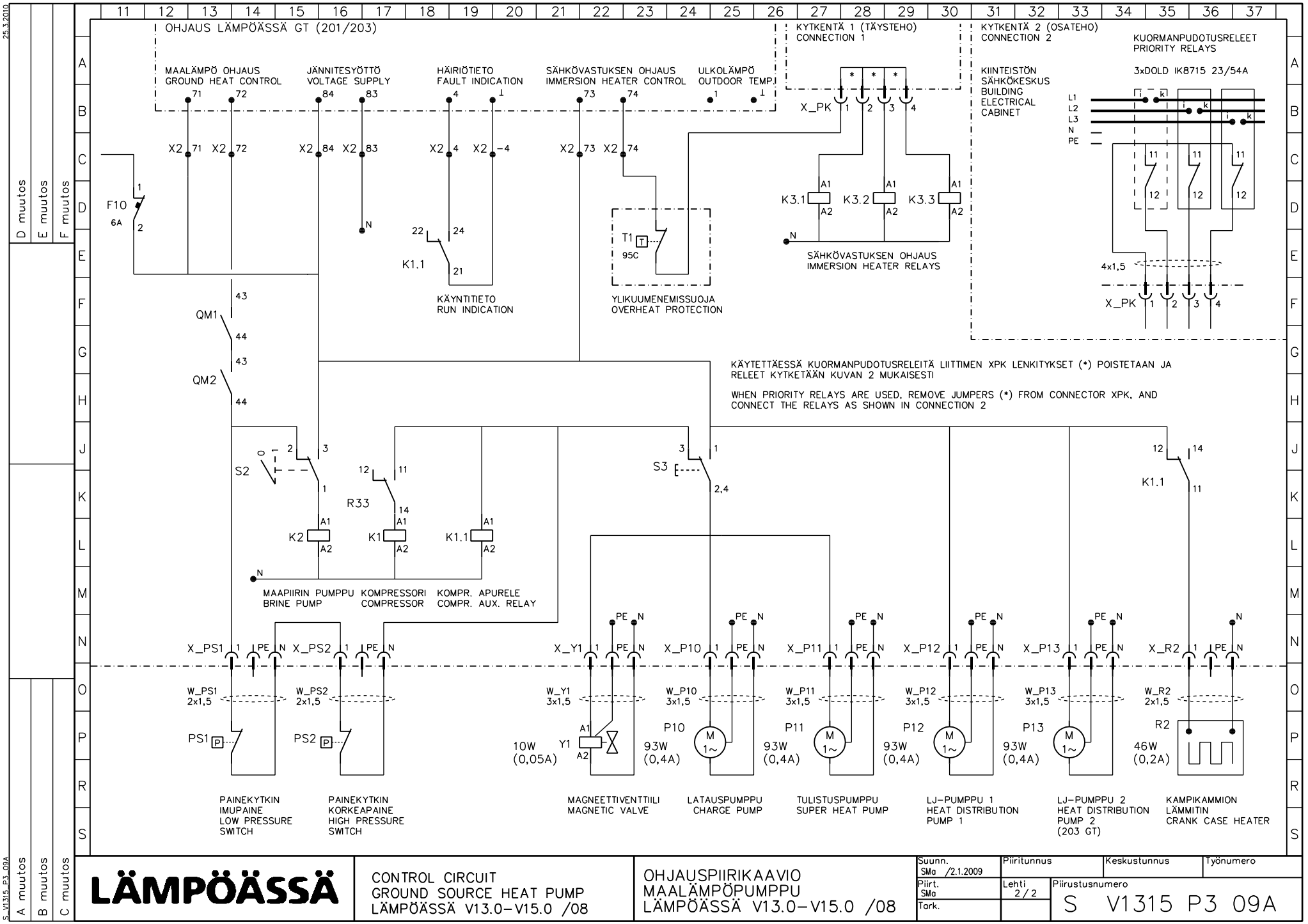
MAIN CIRCUIT
GROUND SOURCE HEAT PUMP
LÄMPÖÄSSÄ V13.0–V15.0 /08

PÄÄVIRTAKAAVIO
MAALÄMPÖPUMPPU
LÄMPÖÄSSÄ V13.0–V15.0 /08

Suunn.	Piiritunnus	Keskustunnus	Työnumero
SMa /2.1.2009			
Piirt. SMa	Lehti 1/2	Piirustusnumero S V1315 P3 09A	
Tark.			

D muutos
E muutos
F muutos
A muutos
B muutos
C muutos

S_V1315_P3_09A
25.3.2010



LÄMPÖÄSSÄ	CONTROL CIRCUIT GROUND SOURCE HEAT PUMP LÄMPÖÄSSÄ V13.0–V15.0 /08	OHJAUSPIIRIKAAVIO MAALÄMPÖPUMPPU LÄMPÖÄSSÄ V13.0–V15.0 /08	Suunn. SMa /2.1.2009 Piirt. SMa Tark.	Piiritunnus Lehti 2/2	Keskustunnus Piirustusnumero S V1315 P3 09A

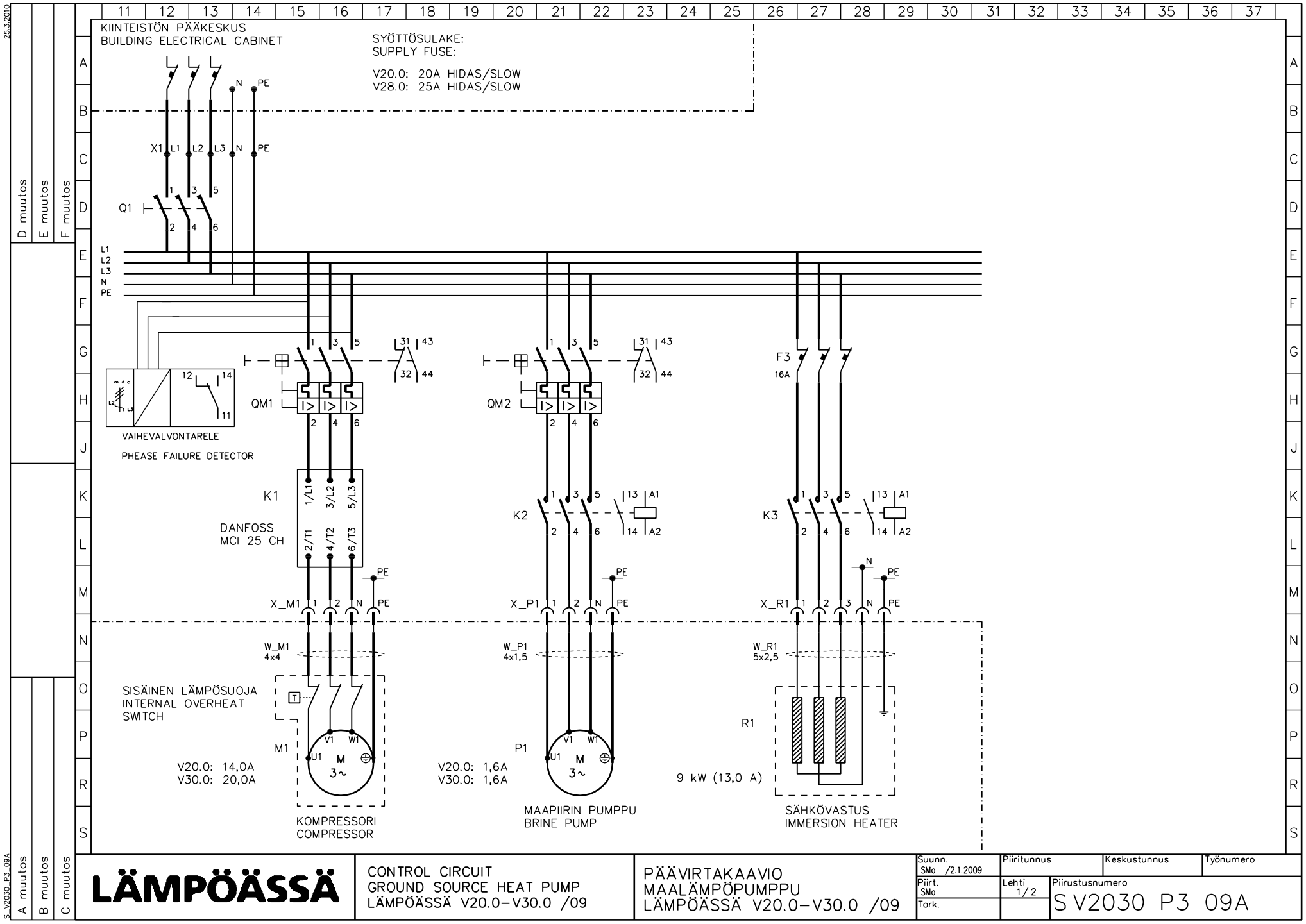
Työnumero

D muutos E muutos F muutos

A muutos B muutos C muutos

25.3.2010

S_V1315_P3_09A



LÄMPÖÄSSÄ

CONTROL CIRCUIT
GROUND SOURCE HEAT PUMP
LÄMPÖÄSSÄ V20.0–V30.0 /09

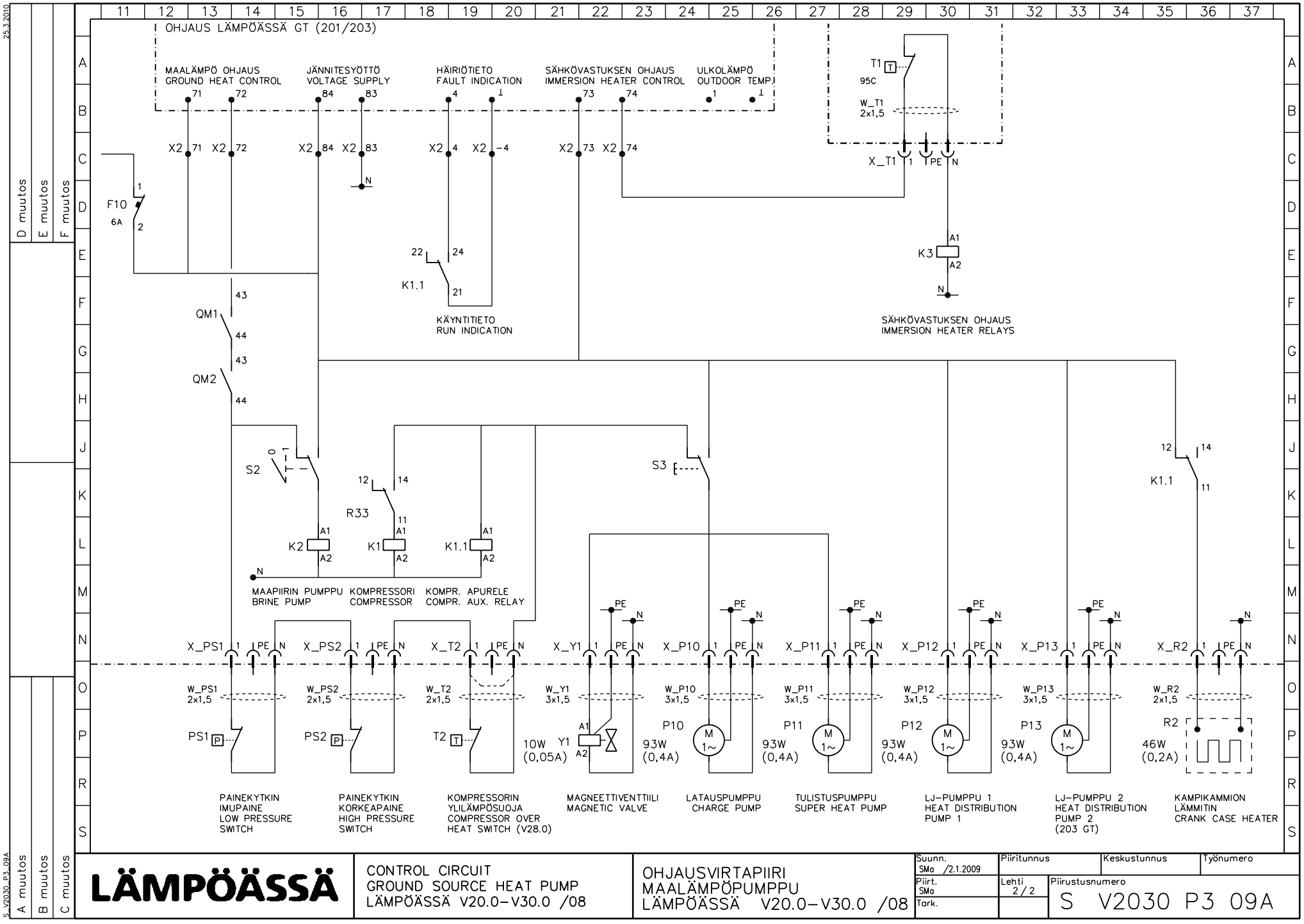
PÄÄVIRTAKAAVIO
MAALÄMPÖPUMPPU
LÄMPÖÄSSÄ V20.0–V30.0 /09

Suunn.	Piiritunnus	Keskustunnus	Työnumero
SMa /2.1.2009			
Piirt. SMa	Lehti 1/2	Piirustusnumero	
Tark.		S V2030 P3 09A	

D muutos
E muutos
F muutos
A muutos
B muutos
C muutos

25.3.2010

S_V2030_P3_09A



LÄMPÖÄSSÄ

CONTROL CIRCUIT
GROUND SOURCE HEAT PUMP
LÄMPÖÄSSÄ V20.0–V30.0 /08

OHJAUSVIRTAPIIRI
MAALÄMPÖPUMPPU
LÄMPÖÄSSÄ V20.0–V30.0 /08

Suunn. SMa /2.1.2009	Piiritunnus	Keskustunnus	Työnumero
Piirt. SMa	Lehti 2/2	Piirustusnumero S V2030 P3 09A	
Tark.			

25.3.2010

D muutos
E muutos
F muutos

A muutos
B muutos
C muutos

S_V2030_P3_09A

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